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## Investigation of the anisotropy of pressure of magnetars

Magnetars are strong magnetized neutron stars endowed with surface magnetic fields of the order of  $10^{14} - 10^{15}$  G, and with presumably much stronger fields in their interior. They could emit quiescent X-ray, repeating burst of soft gamma ray, and even the giant flares. We investigate the effects of a strong magnetic field *B* on the anisotropy of pressure of magnetars using a relativistic mean-field theory model. Within a variable magnetic field configuration, the stellar structure is obtained. The mass and radius of magnetars are found to be weakly enhanced by the strong magnetic field. By considering the magnetization of charged particles in a

strong magnetic field, we calculate the pressure parallel to the magnetic field, and the pressure perpendicular to the magnetic field, and find that the anisotropy of pressure caused by the magnetic field can be ignored. Unlike other previous study, the magnetic field is unable to violate the mass limit of neutron stars.

Key words:Magnetars, relativistic mean field theory, anisotropy of pressure, equation of state

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